202301UECM2453OE4a

Start again

Review of preview

Started on	Sunday, 16 April 2023, 04:00 PM
Completed on	Sunday, 16 April 2023, 04:00 PM
Time taken	17 secs
Grade	**0** out of a maximum of 10 (**0**%)

1

Marks: 1

Consider the following 3-period binomial interest rate tree where the initial interest (continuously compounded) rate is 11% and rates can move up or down by 2.5% at the end of each year. The risk-neutral probability of an up move is 0.59.

$r_0 = 11\%$; $r_d = 8.5\%$; $r_u = 13.5\%$; $r_{dd} = 6.0\%$; $r_{du} = 11.0\%$; $r_{ud} = 11.0\%$; $r_{uu} = 16.0\%$;

Find the price of a two-year 369.0-strike call on a 1-year zero-cuopon bond of face value 400. _____

Answer:

Make comment or override grade

Incorrect
Correct answer: 1.0659
Marks for this submission: 0/1.

2

Marks: 1

Consider the following 3-period binomial interest rate tree modelling the effective annual yields. The risk-neutral probability of an up move is 0.47.

$r_0 = 9\%$; $r_d = 7.47\%$; $r_u = 10.8\%$; $r_{dd} = 6.2\%$; $r_{du} = 8.96\%$; $r_{ud} = 8.96\%$; $r_{uu} = 12.96\%$

Find the yield rate of a three-year 18% annual-coupon bond of face value 100. _____

Answer:

Make comment or override grade

Incorrect
Correct answer: 0.08935
Marks for this submission: 0/1.

3

Marks: 1

You are given the following binomial interest rate tree modeling the annual effective interest rate:

$r_0 = 8.8\%$, $r_u = 10.732\%$, $r_d = 7.907\%$,

$r_{uu} = 13.849\%$, $r_{ud} = r_{du} = 11.443\%$ $r_{dd} = 8.193\%$

The risk-neutral probability that the annual effective interest rate moves up or down is 0.5. Find the price of a caplet with a guaranteed rate of 11% for a loan of 100 for year 3. _____

Answer:

Make comment or override grade

Incorrect
Correct answer: 0.6837
Marks for this submission: 0/1.

4

Marks: 1

Consider the following 3-period binomial interest rate tree for effective annual rates. The risk-neutral probability of an up move is 0.6.

$r_0 = 9.0\%$; $r_d = 7.7\%$; $r_u = 11.4\%$

$r_{dd} = 5.5\%$; $r_{ud} = r_{du} = 9.4\%$; $r_{uu} = 13.3\%$

Find the price of a 9.0% interest rate cap on a 100 three-year loan with annual interest payments. _____

Answer:

Make comment or override grade

Incorrect
Correct answer: 2.2304

Marks for this submission: 0/1.

5

Marks: 1

Consider the following incomplete BDT tree model for the effective annual interest rates:

$r_0 = 9.5\%$, $r_u = 12.0\%$, $r_d = 8.8\%$,
$r_{uu} = 17.6\%$, $r_{ud} = r_{du} = 13.7\%$
$r_{udd} = 10.2\%$, $r_{uuu} = 17.6\%$

Calculate the price of a 95.0-strike 2-year put on a 2-year 5% annual coupon bond with face value 100, maturing at time 4. _____

Answer:

Make comment or override grade

Incorrect
Correct answer: 6.7291

Marks for this submission: 0/1.

6

Marks: 1

Consider the following incomplete BDT tree model for the effective annual interest rates:

$r_0 = 8.7\%$, $r_u = 12.1\%$, $r_d = 9.6\%$,
$r_{uu} = 16.4\%$, $r_{ud} = r_{du} = 13.8\%$
$r_{udd} = 10.5\%$, $r_{uuu} = 16.9\%$

Calculate the price of a 3-year caplet with a cap rate of 10.5% for the notational amount of 100. _____

Answer:

Make comment or override grade

Incorrect
Correct answer: 2.4521

Marks for this submission: 0/1.

7

Marks: 1

In a Black-Derman-Toy tree with period of one year:

- The lognormal yield volatility of 3-year zero-coupon bonds after two years is 0.13.
- The lognormal yield volatility of 2-year zero-coupon bonds after one years is 0.11.
- The effective annual yield on 1-year zero-coupon bonds issued at the end of two years is 0.03 at the lowest node.
- The effective annual yield on 1-year zero-coupon bonds issued at the end of one year is 0.05 at the lowest node.

Determine the lognormal yield volatility of 3-year zero-coupon bonds after one year. _____

Answer:

Make comment or override grade

Incorrect
Correct answer: 0.1157

Marks for this submission: 0/1.

8

Marks: 1

You are given then following information:

Bond maturity (years)	1	2	3
Zero-coupon bond price	0.9715	0.9292	0.886

A 1-year European call option gives you the right to purchase a zero-coupon bond that matures at time 3 for 0.92. The bond forward price is lognoemally distributed with volatility 0.19. Using the Black formula, calculate the price of the call option. _____

Answer:

Make comment or override grade

Incorrect
Correct answer: 0.0635
Marks for this submission: 0/1.

9
Marks: 1

You are given the following information for a 1-year zero-coupon bonds:

t	1	2	3	4	5
(t-1)- year forward price for 1-year bond	0.9	0.89	0.88	0.87	0.86
Volatility of t- year prepaid forward price for 3-year bond	0.05	0.07	0.09	0.11	0.13

Using Black's formula, calculate the price of a 2-year European call option with strike price 0.67 on a 3-year bond. _____

Answer:

Make comment or override grade

Incorrect
Correct answer: 0.0175
Marks for this submission: 0/1.

10
Marks: 1

Let P(0,T) be the time-0 price of a zero-coupon bond that pays 1 at time T. You are given:

T	P(0,T)	Var[ln $P(T, T_{0.5}]/T$]
0.5	0.9219	0.0635
1	0.8705	0.0729
1.5	0.8242	0.0961
2	0.7835	0.1122

Calculate the price of 1.5-year 0.91-strike put on a 6-month zero-coupon bond of face value 1 using Black formula. _____

Answer:

Make comment or override grade

Incorrect
Correct answer: 0.0966
Marks for this submission: 0/1.